

The Matrix – Detailed Annotations

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Detailed Annotations – Matrix 01: Medical Product Design: Single Patient Use vs. Sustainability

(1) Kadamus, Chris. "Sustainability in Medical Device Design." *Medical Device & Diagnostic Industry*. (01 Sept. 2008) Online. <<http://www.mddionline.com/article/sustainability-medical-device-design>>. (2) Chris Kadamus is a principle design engineer at Cambridge Consultants in Cambridge, MA. He doesn't appear to have any other published articles. (3) The main topic of this text is to promote understanding of necessary balance between sustainability and market needs, regulations, and standards. (4) Kadamus points out the factors pushing the industry towards sustainability, the factors delaying that push and his thoughts on how it will balance out and sustainable design can work. (5) "Producing more than 1 million tn of waste per year, healthcare facilities in the United States alone spend more than \$130 million per year to move, store, and incinerate their waste." "Approximately 90% of medical device waste consists of disposable, one-time-use products or components... Adherence to this business model is advanced by the risks associated with hazardous medical waste, biological contamination, and the high cost of product sterilization and reprocessing." "Sustainable product design not only benefits the environment and society, but it also provides for long-term economic vitality." (6) Kadamus' argument essentially is my research focus. He spends a good part of his article explaining the barriers to sustainable design implementation in the medical device industry. (7) See (5).

(1) "Waste Reduction: Why Focus on Waste," (Arlington, VA, *Practice Greenhealth* Online. <<http://cms.h2e-online.org/ee/waste-reduction>>. (2) No specific author is noted for this precise article, however, Practice Greenhealth has a board of directors that consists of: Barbara Blakensy, MS, RN, past president of the American Nurses Association, Charlotte Brody, RN, National Field Director for Safer Chemicals, Healthy Families, Noedahn Copley-Woods, Fellow of the American College of Obstetricians/Assistant Professor at the University of Pittsburg School of Medicine, Kathy Gerwig, VP, Workplace Safety and Environmental Stewardship Officer, Kaiser Permanente, Bruno Giacomuzzi, VP, Professional Services, Resurrection Medical Center, Jeffery Hollender, Entrepreneur, Al Iannuzzi, Sr. Director, Worldwide Environment, Health & Safety at Johnson & Johnson, John Strong, Principal, John Strong, LLC, Sister Susan Vickers, RSM, VP, Community Health, Dignity Health, and Alan Yuspeh, Sr. VP and Chief Ethics and Compliance Officer, HCA. (3) This article focuses on the waste produced by hospitals and the healthcare industry in general and provides resources for assisting healthcare facilities in tracking, managing, and minimizing their waste streams. (4) First the article provides metrics on how much waste is produced by hospitals. Then it details the concerns related to waste creation. Finally, it finishes with a robust list of links to other areas of the website directly addressing how to positively

The Matrix – Detailed Annotations

impact certain aspects of medical waste. (5) “Hospitals in the US produce more than 5.9 million tons of waste annually—a figure based on the amount of waste produced per staffed bed per day (33lbs)...”, “Beyond the fact that hospitals are spending valuable financial resources to dispose of these large volumes of waste, the ways in which waste is handled has the ability to significantly impact human health and the environment.” , “Waste reduction goes hand-in-hand with a focus on purchasing, as everything procured eventually becomes the waste or “stuff” we no longer want or can use.” (6) The article directly addresses how medical waste is a problem fiscally as well as environmentally and it touches on the need to consider making sustainable purchasing decisions. (7) “The United States alone produces more than 6600 tons of medical waste per day, totaling well over 2 million a year.” And the following metrics: About 85% of medical waste need not be incinerated, and Healthcare facilities in the United States spend more than \$130 million annually to move, store, and incinerate their waste.

(1) “An Environmental Guide for the Medical Device Industry of Massachusetts,” *Commonwealth of Massachusetts Executive Office of Environmental Affairs* (Boston, December 2006): 46. (2) This 107 page document is not credited to any specific individuals, but is noted to have been prepared by the Commonwealth of Massachusetts Executive Office of Environmental Affairs Office of Technical Assistance and Technology. The list of acknowledgements includes Paul Richard, Office of Technical Assistance (OTA) Director, Dr. John Raschko, OTA Project Manager, Thomas Balf of Nexus Environmental Partners, Thomas Sommer, President, MassMEDIC, Robert Rio, Vice President, Associated Industries of Massachusetts, Allan Cameron, Principal, Design Continuum, Mitch Campbell, EH&S Director, Haemonetics, Michael Covenor, EH&S Manager, Medtronic, Michael D’Eufemia, Manager, EH&S, Smith & Nephew, Betsy Goodrich, Vice President, Manta Design, William Harrison, Senior Environmental Engineer, Tyco Healthcare-Kendall, Jeff Long, Vice President, Luxtec, W. Grant McGimpsey, Director, WPI Bioengineering Institute, and Lucy Servidio, Senior Environmental Scientist, Capaccio Environmental Engineering, Inc. (3) The purpose of this document is to provide a guide to the environmental issues inherent in the design and manufacture of medical devices, and to raise awareness of key issues and provide access to related information. (4) This document first details the types of environmental attributes one may consider for product design and then provides information on how to minimize negative environmental impacts associated with design and manufacture. It then proceeds to discuss environmental manufacturing regulations and compliance for the state of MA, and finally, it provides case studies and direction towards further assistance and guidance. (5) “In order to reduce production costs and minimize human error, medical device companies are increasingly being asked by product users or health care providers to create single use or disposable items, rather than products that can be reused or even recycled. Single-use plastic medical products now have an approximately 90% share of the medical-market poundage.”, “Medical device manufacturers and product managers should clearly articulate environmental goals, as applicable, and chemical or material restrictions to ensure product compliance with applicable standards and conformance with company environmental commitments.”, “The same quantitative and compelling long-term financial arguments must be made for environmental

The Matrix – Detailed Annotations

attributes.” (6) Again, this article also points out the need for a more sustainable medical product industry, but also takes into account the need for single-patient-use items. (7) “Approximately 90% of medical device waste consists of disposable, one-time-use products or components.” and the correlation/overlap between financial drive and sustainable drive.

Detailed Annotations – Matrix 02: Trading-In Spot for Carbon Credits?

(1) Vale, Robert, and Brenda Vale. *Time to Eat the Dog?: The Real Guide to Sustainable Living*. London: Thames & Hudson, 2009. Print. (2) Doctor Robert and Brenda Vale are professors at the School of Architecture, Victoria University of Wellington, New Zealand. They are architects, writers, researchers, and experts in the field of sustainable housing. They’ve co-authored six books on the topics of architecture and sustainable building in addition to this one, and Brenda has written a book of fiction. (3) According to the Amazon Book Description: “Brenda and Robert Vale explore the environmental impact of the decisions we make, from what we eat and what we wear to how we travel and enjoy ourselves.” (4) The Vales emphasize their belief that all resources are finite which counters our system that has “locked” us into the need for growth. They do this by providing lots of metrics and statistics. Additionally, they provide detailed suggestions on what people should give up in order to live more sustainably. It painstakingly, and unfortunately rather boringly, provides detail upon detail in order to attempt to cover all their perceived levels of the matrix. (5) “The carbon paw print of a pet dog is more than double that of a gas-guzzling sports utility vehicle.”, “A medium-sized dog’s annual diet is estimated to contain about 360 pounds of meat and 200 pounds of grains and requires roughly double the resources it would take to drive a sports utility vehicle (SUV) 6200 miles a year”, and “it takes 0.84 hectares of land to keep a medium-sized dog fed and compares this to running a 4.6 liter Toyota Land Cruiser, which, when including the energy required to construct it and to drive it 10,000 kilometers a year, requires 0.41 hectares.” (6) The Vales’ argument marks the starting point for my research topic: are pets more sustainable or more unsustainable and should we give them up? Their opinion is that yes, we should all trade in our dogs and other pleasurable aspects of life for carbon credits...except for them. They can keep their cat, and continue to travel abroad for conferences, and buy a new home, and hoard vast collections of things. (7) See (5).

(1) *New Scientist*. 24 2009. Web. 29 Oct. 2012. <<http://www.newscientist.com/article/mg20427313.200-cute-fluffy-and-horribly-greedy.html>>. (2) A specific author is not listed for this article, however, as a published document, there is an editorial team. The members of the Opinion section editorial team include: Associate Editor Liz Else, Letters and Comments Editor, Jon White, CultureLab Editors Tiffany O’Callaghan and Kat Austen, Interviews Editor Alison George, and Feedback Editor John Hoyland. (3) The main topic of this text is analysis of the Vales’ book. (4) Direct quotes are taken from the text, then they are analyzed and expanded upon, and then conclusions are drawn at the end from the analysis. (5) “To measure the ecological paw, claw and fin-prints of the family pet, the Vales analysed the ingredients of

common brands of pet food. They calculated, for example, that a medium-sized dog would consume 90 grams of meat and 156 grams of cereals daily in its recommended 300-gram portion of dried dog food. At its pre-dried weight, that equates to 450 grams of fresh meat and 260 grams of cereal. That means that over the course of a year, Fido wolfs down about 164 kilograms of meat and 95 kilograms of cereals.”, “Waggly tail or not, owning a pet comes at a far higher cost than you might imagine. As you watch a large dog bounding out of the back of an SUV, you might mentally reprimand the owner for their choice of vehicle. You would do better to save your indignation for their choice of pet.” “Because, as we report on page 46, the ecological footprint of our companion animals can dwarf that of even the most gas-guzzling cars. Man's best friend, it turns out, is the planet's enemy.” (6) The argument from New Scientist continues upon the quantitative assessment of pet consumption and the supposed impacts of it. (7) See (5).

(1) Nestle, Marion. Interview by Eating Libera'll's Kat. "Let's Ask Marion: Is Fido the New Hummer?." *Eating Liberally*. 22 2009. Web. 29 Oct 2012. <http://livingliberally.org/eating/blog/Lets-Ask-Marion-Fido-New-Hummer>. (2) Dr. Marion Nestle is a professor in the Department of Nutrition, Food Studies, and Public Health and a Professor of Sociology, both at NYU. She has a PhD in molecular biology and an MPH in public health nutrition, both from University of California, Berkeley. She's authored six books on the topics of both food and pet food as well as a monthly Food Matters column for the San Francisco Chronicle and blogs at foodpolitics.com and The Atlantic. (3) The main topic of the interview with Nestle is her counter argument to the Vales' push towards forgoing pet ownership. (4) Nestle evaluates and verifies some of the quantitative data presented by the Vales, then calls them out on missing qualitative data and concludes by noting the environmental value of pets. (5) “The authors of the book are overestimating the amount of food needed by dogs by a factor of two.”, “On the qualitative side: Most dogs don't eat the same meat humans do. They eat meat by-products—the parts of food animals that we wouldn't dream of eating.”, “We think pet food performs a huge public service. If pets didn't eat all that stuff, we would have to find a means of getting rid of it: landfills, burning, fertilizer, or converting it to fuel, all of which have serious environmental consequences.” (6) Nestle addresses neglected areas of the matrix by the Vales and sheds new light on their argument by expanding the frame they've put around their argument. (7) See (5).